

REMARKS/ARGUMENTS

This Amendment is submitted in response to the Office Action dated August 12, 2005, and within the three-month period for reply extending to November 14, 2005. The status of the claims is summarized as follows.

5 Claims 1-22 are cancelled per the Restriction Requirement Response filed by the Applicants on June 2, 2005.

Claims 23, 31, and 47 are currently amended.

Claims 23-52 remain pending in the application after entry of this Amendment.

10 **Specification**

The title of the application is changed to "METHOD AND APPARATUS FOR MATERIAL DEPOSITION IN SEMICONDUCTOR FABRICATION."

Paragraph [1] beginning at page 1, line 9, is amended to include the cross-referenced application number.

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Rejections under 35 U.S.C. 102

Claims 23-52 were rejected under 35 U.S.C. 102(e) as being anticipated by Homma et al., ("Homma" hereafter) (U.S. Patent Application Publication No. US2003/0098241A1). These rejections are respectfully traversed.

20 Homma teaches a method and apparatus for growing a metal barrier layer on a wiring substrate while simultaneously abrading the wiring substrate to control the growth of the metal barrier layer. More specifically, Homma discloses an apparatus defined to apply a wiring substrate downward to contact a rotating platen with a controlled downward force, wherein the rotating platen is covered by an abrasive surface. The
25 apparatus of Homma is further configured to simultaneously apply an electroless plating solution to the platen such that the electroless plating solution finds its way between the

wiring substrate and the abrasive surface of the platen as the platen rotates. The electroless plating solution causes a metal barrier layer to grow on the wiring substrate. Simultaneously, the motion of the abrasive surface of the platen relative to the wiring substrate suppresses growth of the metal barrier layer such that the resulting metal barrier 5 layer is thin and uniform. However, as discussed below, the disclosure of Homma fails to teach each and every feature of the present invention as required to establish anticipation under 35 U.S.C. 102.

With respect to amended claim 23, Homma fails to teach a radiant energy source disposed above the wafer support structure and oriented to direct radiant energy toward 10 the wafer to be supported at the submerged position within the electroless plating solution. Notwithstanding the fact that Homma fails to teach the radiant energy source, Homma also fails to teach, as amended, that the radiant energy generated by the radiant energy source is defined to heat a material present on the wafer in exposure to the electroless plating solution to enable an electroless plating reaction.

15 The Office has asserted that paragraphs 34 and 48-49 of Homma teach the radiant energy source and its configuration for generating radiant energy that is capable of heating a material present on the wafer surface. However, the Applicants submit that paragraphs 34 and 48-49 of Homma do not include the teachings as asserted by the Office. Paragraphs 34 and 48-49 of Homma disclose the use of light for the purpose of 20 identifying the starting point of the electroless plating process and monitoring the progress of the electroless plating process such that and endpoint of the electroless plating process can be detected.

First, the light source disclosed by Homma is disposed beneath the platen (11, Homma) as opposed to above a wafer support structure. It should be noted that the carrier 25 (16, Homma) is the only component in the apparatus of Homma that can be reasonably construed as representing a wafer support structure. Second, Homma does not teach that

the wiring substrate (15, Homma) is supported at a submerged position within the electroless plating solution. Simply stated, Homma does not mention submerging the wiring substrate (15, Homma) in the electroless plating solution (32, Homma). Third, Homma does not include any teaching that the light used for monitoring the progress of 5 the electroless plating process is defined to heat a material present on the wafer in exposure to the electroless plating solution to enable an electroless plating reaction.

For a claim to be anticipated under 35 U.S.C. 102, the cited art must teach each and every feature of the claim. For at least the reasons identified above, the Applicants submit that Homma fails to teach each and every feature of claim 23. Therefore, the 10 Applicants submit that claim 23 is patentable over Homma. Also, because each of claims 24-30 ultimately depends from and incorporates all features of claim 23, the Applicants submit that claims 24-30 are patentable over Homma for at least the same reasons provided for claim 23. In view of the foregoing, the Office is respectfully requested to withdraw the rejections of claims 23-30.

15 With respect to amended claim 31, the Office has asserted that paragraphs 34 and 48-49 of Homma teach the radiant energy source and its configuration for generating radiant energy that is capable of heating a material present on the wafer surface. Therefore, the arguments previously presented for claim 23 are equally applicable to claim 31. Consequently, the Applicants submit that Homma fails to teach each and every 20 feature of claim 31, as required to establish anticipation under 35 U.S.C. 102. Therefore, the Applicants submit that claim 31 is patentable over Homma. Also, because each of claims 32-41 ultimately depends from and incorporates all features of claim 31, the Applicants submit that claims 32-41 are patentable over Homma for at least the same 25 reasons provided for claim 31. In view of the foregoing, the Office is respectfully requested to withdraw the rejections of claims 31-41.

With respect to claim 42, the Office has not indicated how Homma is asserted to teach the following features:

5 a wafer holder configured to dip a wafer into the electroless plating solution to be contained within the tank, the wafer holder further configured to remove the wafer from the electroless plating solution to be contained within the tank; and

10 a radiant energy source disposed above the electroless plating solution to be contained within the tank, the radiant energy source being oriented to direct radiant energy toward the wafer upon removal of the wafer from the electroless plating solution to be contained within the tank.

Following a thorough review of Homma, the Applicants are unable to find any teaching of a wafer holder that is configured to dip a wafer into and remove the wafer from an electroless plating solution to be contained within a tank. Also, the Applicants 15 are unable to find any teaching in Homma of a radiant energy source that is disposed above the electroless plating solution contained within tank. Furthermore, the Applicants do not find any teaching in Homma of a radiant energy source oriented to direct radiant energy toward the wafer upon its removal from the electroless plating solution.

The Applicants submit that Homma fails to teach each and every feature of claim 20 42, as required to establish anticipation under 35 U.S.C. 102. Therefore, the Applicants submit that claim 42 is patentable over Homma. Also, because each of claims 43-46 ultimately depends from and incorporates all features of claim 42, the Applicants submit that claims 43-46 are patentable over Homma for at least the same reasons provided for 25 claim 42. In view of the foregoing, the Office is respectfully requested to withdraw the rejections of claims 43-46.

With respect to amended claim 47, the electroless plating solution has been clarified to be an electroless plating solution bath. The Applicants submit that Homma does not include any teaching of an electroless plating solution bath. Therefore, the Applicants submit that Homma does not teach a wafer holder configured to rotate a 30 portion of the wafer through the electroless plating solution bath. Also, the Applicants

submit that Homma does not teach a radiant energy source disposed above the electroless plating solution bath. Furthermore, the Applicants do not find any teaching in Homma of a radiant energy source oriented to direct radiant energy toward a portion of the wafer upon its rotation out of the electroless plating solution bath.

5 The Applicants submit that Homma fails to teach each and every feature of claim 47, as required to establish anticipation under 35 U.S.C. 102. Therefore, the Applicants submit that claim 47 is patentable over Homma. Also, because each of claims 48-51 ultimately depends from and incorporates all features of claim 47, the Applicants submit that claims 48-51 are patentable over Homma for at least the same reasons provided for 10 claim 47. In view of the foregoing, the Office is respectfully requested to withdraw the rejections of claims 48-51.

With respect to claim 52, Homma does not teach a wafer support structure configured to support a wafer at a submerged position within an electroless plating solution. As previously discussed, Homma does not teach that the wiring substrate (15, 15 Homma) is supported at a submerged position within the electroless plating solution. Simply stated, Homma does not mention submerging the wiring substrate (15, Homma) in the electroless plating solution (32, Homma).

Further with respect to claim 52, Homma does not teach a radiant energy source disposed within the wafer support structure. As previously discussed, the carrier (16, 20 Homma) is the only component in the apparatus of Homma that can be reasonably construed as representing a wafer support structure. The carrier (16, Homma) is not disclosed as having a radiant energy source disposed therein. Thus, Homma does not teach the radiant energy source disposed within the wafer support structure.

Notwithstanding the fact that Homma does not teach the radiant energy source 25 disposed within the wafer support structure, Homma also fails to teach a radiant energy source that is oriented to direct radiant energy toward a bottom surface of the wafer. As

previously discussed, the Office has incorrectly asserted that the light used in Homma for monitoring the progress of the electroless plating process represents the radiant energy as recited in claim 52. In contrast to the present invention, it should be noted that the light used in Homma for monitoring the progress of the electroless plating process is oriented 5 to be directed to the top surface of the wiring substrate (15, Homma), as the wiring substrate is maintained in an inverted position by the carrier (16, Homma). Furthermore, the light used in Homma is not disclosed as being capable of traversing through a wafer from bottom to top such that a material present on the top surface of the wafer is heated by the light. Thus, Homma fails to teach the radiant energy capable of traversing through 10 the wafer to heat the material present on the top surface of the wafer, as required by claim 52.

For at least the reasons identified above, the Applicants submit that Homma fails to teach each and every feature of claim 52, as required to establish anticipation under 35 U.S.C. 102. Therefore, the Applicants submit that claim 52 is patentable over Homma.

15 The Office is respectfully requested to withdraw the rejection of claim 52.

The Applicants respectfully submit that all of the pending claims are in condition for allowance. Therefore, a Notice of Allowance is requested. If the Examiner has any questions concerning the present Amendment, the Examiner is kindly requested to contact the undersigned at (408) 774-6914. Also, if any additional fees are due in connection with filing this Amendment, the Commissioner is authorized to charge Deposit Account No. 50-0805 (Order No. LAM2P458). A duplicate copy of the transmittal is enclosed for this purpose.

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Respectfully submitted,
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